

EXHIBIT DX76

TO DECLARATION OF PETER J GOSS IN
SUPPORT OF REPLY TO DEFENDANTS'
MOTION TO EXCLUDE OPINIONS AND
TESTIMONY OF PLAINTIFFS' PLAINTIFFS'
ENGINEERING EXPERTS

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4 In Re:

5 Bair Hugger Forced Air Warming
6 Products Liability Litigation

8 This Document Relates To:

9 All Actions MDL No. 15-2666 (JNE/FLM)

3 DEPOSITION OF ROBERT O. CROWDER

4 VOLUME 1, PAGES 1 - 95

5 MARCH 16, 2017

(The following is the deposition of ROBERT
O. CROWDER, taken pursuant to Notice of Taking
Deposition pursuant to Rule 30(b)(6) of the Federal
Rules of Civil Procedure, via videotape, at the
offices of Ciresi Conlin L.L.P., 225 South 6th Street,
Suite 4600, Minneapolis, Minnesota, commencing at
approximately 9:09 o'clock a.m., March 16, 2017.)

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	Page 2		Page 4
1	APPEARANCES:	1	P R O C E E D I N G S
2	On Behalf of the Deponent:	2	(Witness sworn.)
3	Scott A. Neilson	3	ROBERT O. CROWDER
4	HENSON & EFRON, P.A.	4	called as a witness, being first duly sworn,
5	220 South Sixth Street, Suite 1800	5	was examined and testified as follows:
	Minneapolis, Minnesota 55402-4503	6	EXAMINATION
On Behalf of the Plaintiffs:		7	BY MR. BANKSTON:
Mark D. Bankston		8	Q. All right. Let's start with your name for
KASTER, LYNCH, FARRAR & BALL LLP		9	the record.
1010 Lamar, Suite 1600		10	A. Robert Orvin Crowder.
Houston, Texas 77002		11	Q. Okay. And you have a doctorate; don't you,
Genevieve M. Zimmerman		12	sir?
MESHBESHER & SPENCE, LTD.		13	A. Yes.
1616 Park Avenue		14	Q. Okay. Do you go by Dr. Crowder?
Minneapolis, Minnesota 55404		15	A. Sometimes.
On Behalf of Defendants:		16	Q. Okay. That's -- that's what I'm going to
Peter J. Goss		17	use today to -- to refer to you as, "Dr. Crowder."
BLACKWELL BURKE P.A.		18	Can you tell me who you're employed by?
432 South Seventh Street, Suite 2500		19	A. Pentair.
Minneapolis, Minnesota 55415		20	Q. Okay. What do you do for Pentair?
ALSO APPEARING:		21	A. I'm a technology manager. I oversee our
Ronald M. Huber, Videographer		22	automation, our engineering, and our R&D groups.
		23	Q. Okay. Can you walk me a little bit through
		24	your educational background before you came to work
		25	with Pentair.
	Page 3		Page 5
1	I N D E X	1	A. Okay. I have an undergraduate degree in
2	EXHIBITS	2	chemical engineering from the University of Colorado,
3	DESCRIPTION	3	I graduated in 1991; I then went on to the University
4	Ex 372 Memo dated 3/15/99, Zgoda to	4	4 of Minnesota where I got a Ph.D. in chemical
5	Lastovich, 3MBH01735994	5	engineering in 1996.
6	373 E-mail string, 3MBH00024857	6	Q. Okay. And you have some work in the
7	374 Filter testing graphs,	7	published literature; correct?
8	3MBH00022367-70	8	A. Correct.
9	375 E-mail string, 3MBH00026515-6	9	Q. Okay. I found a couple things just looking
10	376 E-mail, 3MBH00026490	10	10 in the Journal of Membrane Science. You've done some
11	377 E-mail string, 3MBH01929391-2	11	11 work with mass transfer resistances, things like that.
12	378 Letter dated August 7th, 2013,	12	A. Yes.
13	Shaffer to Arizant Healthcare,	13	Q. Okay. When did you first come to work for
14	Inc., with attachment,	14	Porous Media?
15	3MBH00125235-7	15	A. After I received my Ph.D. in late 1996, they
16	379 E-mail string, 3MBH01922062-4	16	began funding a post-doctoral fellowship for me where
17	380 E-mail string, 3MBH02109276-9	17	I was doing some research into some areas they were
18	381 Pentair Modified 505 Filter spec	18	interested in, and that went on for maybe nine months,
19	sheet, 3MBH01922948	19	and they decided at that point to hire me.
20		20	Q. Okay. Now at one point --
21	WITNESS	21	I'm going to try to understand how the
22	EXAMINATION BY	22	corporate forms work, and I understand that there was
23	Robert O. Crowder	23	a company called Porous Media --
24	Mr. Bankston	24	A. Correct.
25	Mr. Goss	25	Q. -- but now your employer is known as

2 (Pages 2 to 5)

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<p>1 Pentair.</p> <p>2 A. Correct.</p> <p>3 Q. Was that a -- an acquisition situation, a</p> <p>4 name change, how did that come about?</p> <p>5 MR. NEILSON: Objection, foundation.</p> <p>6 Go ahead.</p> <p>7 A. We were purchased by Pentair.</p> <p>8 Q. Okay. And then once you were purchased by</p> <p>9 Pentair, did the -- your job responsibilities change</p> <p>10 in any meaningful way?</p> <p>11 A. No.</p> <p>12 Q. Okay. Now do you --</p> <p>13 You understand that I've asked you to come</p> <p>14 here today because Pentair is a supplier of a part for</p> <p>15 the Bair Hugger device; correct?</p> <p>16 A. I understand.</p> <p>17 Q. Okay. Do you know when Porous Media first</p> <p>18 became a supplier for Bair Hugger products?</p> <p>19 A. I believe it was in the 1990s. I don't know</p> <p>20 the exact date.</p> <p>21 Q. Okay. And up 'til the present day Pentair</p> <p>22 remains a supplier for the Bair Hugger products?</p> <p>23 A. Correct.</p> <p>24 Q. Okay. When I say Bair Hugger 505 versus</p> <p>25 Bair Hugger 750, do you know what I'm talking about?</p>	<p>Page 6</p> <p>1 else that's being supplied?</p> <p>2 A. No.</p> <p>3 Q. Okay. So let's talk just a little bit about</p> <p>4 how a filter works. The filters that are used in the</p> <p>5 Bair Hugger, what are they made of?</p> <p>6 MR. NEILSON: Objection, vague.</p> <p>7 A. Are you asking about the filter media or the</p> <p>8 frame --</p> <p>9 Q. Well let's -- let's --</p> <p>10 A. -- or --</p> <p>11 Q. Yeah. Let's start, first, upper level. I</p> <p>12 take it when you have a filter, there's -- there's</p> <p>13 some sort of housing or frame to it; correct?</p> <p>14 A. Correct.</p> <p>15 Q. Okay. And what is that made out of?</p> <p>16 A. It depends on the filter.</p> <p>17 Q. Okay. For the -- for the Bair Hugger 500</p> <p>18 and 750 models, do they have the same frames, do you</p> <p>19 know?</p> <p>20 A. They do not.</p> <p>21 Q. Okay. So those two filters would have</p> <p>22 different shapes and sizes.</p> <p>23 A. Correct.</p> <p>24 Q. Okay. Now I imagine another part of the</p> <p>25 filter would be the media inside the filter; correct?</p>
<p>Page 7</p> <p>1 A. Yes, I do.</p> <p>2 Q. Okay. And I kind of want to confine our</p> <p>3 discussion today to those products, the -- the newer</p> <p>4 Bair Hugger models, but before we move on to that,</p> <p>5 I -- I just want to understand: Do you know, sitting</p> <p>6 here today, what all models that Pentair has supplied</p> <p>7 parts for the Bair Hugger?</p> <p>8 A. I know of three filters that we currently</p> <p>9 provide that I believe are used for the Bair Hugger</p> <p>10 line. I know there were others in the past.</p> <p>11 Q. Okay. For instance, I know that there are</p> <p>12 some Bair Hugger units in the past for which Porous</p> <p>13 Media supplied a -- I believe it was a 10-micron</p> <p>14 filter; is that correct?</p> <p>15 A. Correct.</p> <p>16 MR. GOSS: Object to form.</p> <p>17 Q. Okay. The units for the Bair Hugger 505 and</p> <p>18 750, those filters are distinct from the 10-micron</p> <p>19 filter used on the earlier units?</p> <p>20 A. The 505 was, to my understanding, originally</p> <p>21 manufactured with what we would call our M10 media.</p> <p>22 Q. Okay. Let's talk a little bit about, before</p> <p>23 we jump too deep into all of this: When it comes to</p> <p>24 what Pentair supplies for Bair Hugger products, is</p> <p>25 that limited to just the filter? Is there anything</p>	<p>Page 9</p> <p>1 A. Correct.</p> <p>2 Q. Okay. What is that made of in those</p> <p>3 filters, do you know?</p> <p>4 MR. NEILSON: Objection, vague as to time.</p> <p>5 A. We use a support layer in addi -- in</p> <p>6 addition to tighter filter media. The support layer I</p> <p>7 believe is polyester and the filter media is a</p> <p>8 borosilicate glass fiber with a binder.</p> <p>9 Q. Okay. In -- in general, I was wondering if</p> <p>10 you could describe to us in sort of layman's terms how</p> <p>11 a filter takes particles out of the air. What</p> <p>12 is -- what is the means by which it does that?</p> <p>13 A. When filtering particles from air, there are</p> <p>14 several different means of capturing the particle:</p> <p>15 one would be a simple sieve mechanism where the</p> <p>16 particle is too large to fit through the pores in the</p> <p>17 filter media; another one would be interception where</p> <p>18 at some point in the flow the particle touches one of</p> <p>19 the fibers in the -- in the glass fiber media and</p> <p>20 becomes bound to the media; another mechanism is</p> <p>21 interception with inertial effects where the particle,</p> <p>22 because it weighs more than the air that's moving</p> <p>23 through the media, may follow a different path than</p> <p>24 the bulk of the air and impacts the -- the filter</p> <p>25 media; and then there's also some other mechanisms</p>

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<p>1 like charge that can allow particles to become 2 attracted to the media; and for very small particles 3 there's Brownian motion in which the particle starts 4 to interact with individual molecules in the air and 5 follows a more random path than the -- the bulk of the 6 airflow would show.</p> <p>7 Q. Okay. The filters that are used in the Bair 8 Hugger 505 and 750, do they utilize all of those 9 mechanisms of capture, or just some of those?</p> <p>10 A. They would likely utilize all those 11 mechanisms.</p> <p>12 Q. Okay. When I'm thinking in my mind about 13 what a filter looks like down on the small level, and 14 you had -- you had mentioned the terms, I believe, 15 "fibers," am I correct to assume that the filter media 16 is -- is a series of interlocking fibers that have 17 holes in it? And for the record, I'll put my hands 18 like a Tic-Tac-Toe board. Is that -- is that an 19 accurate way to talk about the shape of the media of 20 the filter?</p> <p>21 A. In -- in these particular filters it is, to 22 my understanding, a random laying of glass fibers.</p> <p>23 Q. Okay. And filters can be designed with 24 different levels of density; correct?</p> <p>25 A. Correct.</p>	<p>Page 10</p> <p>1 Q. Okay. This is -- 2 You'll see in this document a communication 3 to Wendy Lastovich. Do you know Ms. Lastovich? 4 A. Yes, I do. 5 Q. Okay. And was she a contact person for 6 Porous Media dealing with Bair Hugger products? 7 A. Yes. 8 Q. Okay. And are you familiar with Karl Zgoda? 9 A. I probably met him. I don't know him. 10 Q. Okay. This -- this memorandum is talking 11 about blower curves for the next-generation warming 12 unit, and so I want to just use this document as a 13 chance to talk about some terminology here we might 14 use today, and the first of that is "blower curves." 15 Can you tell us what that means? 16 A. I believe they're referring to an output of 17 a blower dependent on the resistance of the circuit. 18 Q. Okay. In -- 19 Later in this paragraph it talks about they 20 are looking for a performance in the 40- to 45-cubic- 21 feet-per-minute range in 1.1 inches of water. When it 22 talks about the measurement in inches of water, do you 23 know what that measurement refers to? 24 A. Yes. 25 Q. Okay. Is that a pressure-drop measurement?</p>
<p>1 MR. GOSS: Object to form. 2 Q. Okay. So if a -- 3 A filter that is more dense, all things 4 being equal, will capture more particles than a filter 5 that is less dense; is that correct? 6 MR. GOSS: Object to form. 7 A. Not necessarily. 8 Q. Okay. What other factors besides density 9 are you thinking of right now that affect how a filter 10 performs in terms of efficiency? 11 A. Density would imply how much of the filter 12 media is taken up by solid glass fibers in this case, 13 and having a larger portion of it taken up by glass 14 fibers doesn't necessarily mean that the pores are 15 smaller. Also, of course, how many particles are 16 captured depends on the particle size in question. 17 Q. Okay. Okay. 18 (Exhibit 372 was marked for 19 identification.) 20 BY MR. BANKSTON: 21 Q. Dr. Crowder, I've put in front of you 22 Exhibit 372, which is a 1999 memorandum from Augustine 23 Medical to Porous Media. Have you seen this document 24 before? 25 A. I saw it in preparation for this meeting.</p>	<p>Page 11</p> <p>1 A. Yes. 2 Q. Okay. Can you explain to us what "pressure 3 drop" means in the context of filters. 4 A. In the context of filters, the pressure drop 5 would be the difference in pressure from upstream of 6 the filter to downstream of the filter. 7 Q. Okay. When it says here that -- a range of 8 1.1 inches of water, how would that be measured? 9 MR. NEILSON: Objection. It does not say "a 10 range." 11 Q. Excuse me. Let me -- let me change that 12 question. 13 When it says here in -- in the sentence "at 14 1.1 inches of water," how would you go about measuring 15 that? 16 A. It could be measured with a pressure gauge, 17 a differential pressure gauge, it could be measured by 18 using two pressure gauges, could be used by -- 19 measured by literally using a water column. 20 Q. Okay. One of the -- one of the parameters, 21 it says, on -- the number-one parameter is the 22 "Current 505 geometry," and we had talked about the 23 fact that Porous Media had supplied a filter for the 24 model 505 unit. That media is known as the M10 media; 25 is that correct?</p>

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<p>Page 14</p> <p>1 A. In this period it was the M10 media. 2 Q. Okay. The final sentence of this document 3 talks about not wanting to go to a material that is 4 less efficient at these higher flows than the current 5 filter is at its lower flows, and it gives a figure of 6 95 percent. When in -- 7 When talking about the M10 media, is that 95 8 percent figure meaningful to you? 9 A. No. 10 Q. Okay. When -- when talking about the 11 efficiency of a filter, if I just threw out a 12 percentage and said this filter is 50 percent 13 efficient or 75 percent efficient, it's true that that 14 doesn't mean much until I start putting a size of a 15 particle to it; correct? 16 A. Until you put a size and other test 17 parameters, correct. 18 Q. Okay. When 95 percent is being described 19 here in this document, do you know, sitting here 20 today, what particle size is being referenced for that 21 efficiency? 22 A. No. 23 Q. Okay. 24 (Exhibit 373 was marked for 25 identification.)</p>	<p>Page 16</p> <p>1 questions about using the description that it's highly 2 efficient." Do you see that statement? 3 A. Yes, I do. 4 Q. Do you agree with the -- the content of that 5 statement? 6 A. Not necessarily. 7 Q. Okay. If -- if I had, representing to the 8 public, that I had a -- in this case a one-micron 9 filter and it was removing 40 percent of the particles 10 at that size, is it -- is it fair to call that a 11 high-efficiency filter? 12 A. It could be. 13 Q. What does the term "highly efficient" mean 14 to you? 15 A. I'm not aware of a technical definition for 16 "highly efficient." I would, myself, interpret it to 17 be media that's capable of removing very small 18 particulates from airflow. 19 Q. Okay. Were you aware -- 20 Let's talk first about the -- the M10 media. 21 Were you aware that Arizant and later 3M were 22 representing to the public that that filter was termed 23 a .2-micron, high-efficiency filter? 24 MR. NEILSON: Objection, vague as to time. 25 A. I have heard it referred to as high</p>
<p>Page 15</p> <p>1 BY MR. BANKSTON: 2 Q. All right, Dr. Crowder, this is a -- another 3 document that I had provided in advance of deposition. 4 Did you get a chance to look at this before the 5 deposition? 6 A. Yes, I did. 7 Q. Okay. I wanted to ask you a few questions 8 about this document. I have shown you a -- an August 9 of 2010 e-mail between a Craig Cuta and a Gary Hansen. 10 Do you know who Craig Cuta is? 11 A. Yes, I do. 12 Q. Okay. What does he do? 13 A. He was an engineering manager for Pentair. 14 Q. Okay. And have you met Gary Hansen before? 15 A. Not that I know of. 16 Q. Okay. Were you familiar with him through 17 your work at all? 18 A. No. 19 Q. Okay. There's some discussion in this 20 e-mail about using the term "highly efficient" for a 21 filter, and I wanted to ask you about this statement 22 in the third paragraph where it states, "If someone 23 stated that a filter is highly efficient because it 24 removes 40 percent of one-micron particles at 20 cubic 25 feet per minute air flow, then there would be</p>	<p>Page 17</p> <p>1 efficiency. 2 Q. Did you -- did you know that it was being 3 marketed as a .2-micron filter? 4 A. No. 5 Q. Okay. The M10 filter, do you know sitting 6 here today what its efficiency was at .2 microns? 7 A. No. 8 Q. Okay. Another statement that's made in the 9 third paragraph of this e-mail is that "A window 10 screen could be described as being highly efficient. 11 This is until you start putting a size to the 12 contaminants that you want that screen to contain." 13 Do you agree with that sentiment? 14 A. I think it is difficult to understand 15 efficiency without understanding a -- a challenge 16 that's being put to it, both in terms of particle size 17 and flow and the fluid that's being filtered. 18 Q. In other words, when a filter is used in an 19 application, it's -- it's used with the goal of 20 removing certain kinds of particles; correct? 21 A. Correct. 22 Q. And -- and for -- 23 Depending on the application, the target 24 size and nature of those particles could differ from 25 application to application.</p>

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<p style="text-align: right;">Page 18</p> <p>1 A. Correct.</p> <p>2 Q. Okay. When supplying filters for 3M and for</p> <p>3 Arizant, was there ever any discussion with Pentair or</p> <p>4 Porous Media regarding what the target size or nature</p> <p>5 of the particles being sought to exclude was in this</p> <p>6 particular application?</p> <p>7 A. Not that I know of.</p> <p>8 Q. Okay. And like to bring that into sort of</p> <p>9 to layman's terms, using again this definition of a</p> <p>10 window screen, if I had an application where I wanted</p> <p>11 to stop tennis balls from coming through a filter,</p> <p>12 something even as less dense as a window screen would</p> <p>13 serve that purpose; correct?</p> <p>14 MR. GOSS: Object to form.</p> <p>15 A. Seems likely.</p> <p>16 Q. Okay. Or, for instance, there --</p> <p>17 Have you ever seen mosquito netting before?</p> <p>18 A. Yes.</p> <p>19 Q. And -- and mosquito netting being something</p> <p>20 that can filter out a mosquito, of that size. Is --</p> <p>21 is that -- is --</p> <p>22 In your range of how you work in filtration,</p> <p>23 do -- do your type of filters that you've worked on in</p> <p>24 your career go up to that size, or are you only</p> <p>25 working in small particulate size?</p>	<p style="text-align: right;">Page 20</p> <p>1 for a medical device company, is Pentair typically</p> <p>2 involved in the designing for the clinical needs of</p> <p>3 that product, or are you simply designing for the</p> <p>4 mechanical specifications that you're asked to do?</p> <p>5 MR. NEILSON: Objection, foundation.</p> <p>6 A. It depends on the situation.</p> <p>7 Q. Okay. And let's talk about Pentair's work</p> <p>8 with the Bair Hugger 750 and 505 models. Has there</p> <p>9 been any kind of discussions with Pentair that you</p> <p>10 would classify as being more clinical than</p> <p>11 engineering?</p> <p>12 A. No.</p> <p>13 Q. Okay. For instance, when integrating a</p> <p>14 filter into an appliance, some sort of device, and in</p> <p>15 this case we'll talk a medical device, that may</p> <p>16 involve something like consideration of the</p> <p>17 environment it's going to be used in; correct?</p> <p>18 A. Correct.</p> <p>19 Q. That consideration, did that happen on your</p> <p>20 end at Pentair or on Arizant and 3M's end?</p> <p>21 A. To my understanding, it did not happen on</p> <p>22 our end in this case.</p> <p>23 Q. Okay. For instance, the -- the -- the</p> <p>24 clinical needs, the environment of use of a device,</p> <p>25 are -- are likely to have some impact on what filter</p>
<p style="text-align: right;">Page 19</p> <p>1 A. I've worked across a range of particulate</p> <p>2 sizes.</p> <p>3 Q. Okay. So when we get up to those upper</p> <p>4 sizes, something that might be able to stop, for</p> <p>5 instance, something the size of a mosquito may not be</p> <p>6 able to stop something the size of bacteria; correct?</p> <p>7 A. I guess, depending on the flow and the</p> <p>8 liquid or gas that's being filtered.</p> <p>9 Q. Okay. When you talk about the flow rate and</p> <p>10 how that might affect filtration, am I correct to</p> <p>11 assume that at higher flow rates, the -- the filter</p> <p>12 has a more difficult time capturing particles?</p> <p>13 A. Not necessarily. Going back to the</p> <p>14 discussion I had earlier about capture mechanisms,</p> <p>15 some of those mechanisms are more efficient at higher</p> <p>16 flow.</p> <p>17 Q. So the --</p> <p>18 It's not simply a question of inertia in</p> <p>19 other wise -- in other words.</p> <p>20 A. Well in the case of inertial capture it is a</p> <p>21 question of inertia. In higher flows, particles have</p> <p>22 greater inertia and are more likely to follow a</p> <p>23 straight path and be captured rather than follow the</p> <p>24 fluid flow through the media.</p> <p>25 Q. Okay. When Pentair typically makes a filter</p>	<p style="text-align: right;">Page 21</p> <p>1 is most appropriate for that device. Would you agree</p> <p>2 with that?</p> <p>3 A. I would imagine.</p> <p>4 Q. Okay. In terms of determining what filter</p> <p>5 was appropriate for the Bair Hugger, is that something</p> <p>6 Pentair ever did?</p> <p>7 A. Not to my knowledge.</p> <p>8 Q. Okay. In other words, in this situation it</p> <p>9 was your reliance on your customer who made medical</p> <p>10 devices to identify and -- and select what its needs</p> <p>11 were in terms of a filter.</p> <p>12 A. Correct.</p> <p>13 Q. Okay.</p> <p>14 (Discussion off the stenographic record.)</p> <p>15 BY MR. BANKSTON:</p> <p>16 Q. Dr. Crowder, I'm going to show you what's</p> <p>17 been previously marked as Exhibit 173. This is</p> <p>18 another document that you were able to review before</p> <p>19 your deposition today; correct?</p> <p>20 A. Correct.</p> <p>21 Q. Okay. In this document, again, we have a --</p> <p>22 an e-mail from Ms. Lastovich to -- to Arizant, and it</p> <p>23 talks about DOP efficiency. Can you tell me what that</p> <p>24 term means?</p> <p>25 A. That is an efficiency for media.</p>

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<p style="text-align: right;">Page 22</p> <p>1 Traditionally, it was measured with dioctyl phthalate, 2 which is where the DOP comes from. In some cases they 3 now use other media for measuring that efficiency. 4 Q. Okay. When it talks here about finding -- 5 excuse me. Let me start over. 6 When Ms. Lastovich says "...please find the 7 media efficiencies (prior to pleating and filter 8 assembly)," firstly, can you tell me what they mean by 9 "pleating?" 10 A. Pleating is a process of taking a flat piece 11 of media and folding it in what could be called an 12 accordian shape in order to be able to put a larger 13 amount of filter media into a given volume. 14 Q. Does that pleating process, does that expose 15 more surface area of the filter in that same space? 16 Is that the idea? 17 A. In a given volume, you can have a lot more 18 filter media than if you use simply a flat sheet. 19 Q. Okay. Now when Ms. Lastovich talks about 20 DOP efficiencies in these three models of filter 21 media, you're familiar with all three of those filter 22 media? 23 A. Yes. 24 Q. Okay. So she has a statement that the 25 efficiency is being tested at .3 micron at 10.5 feet</p>	<p style="text-align: right;">Page 24</p> <p>1 Q. Okay. And in fact the media that those 2 units had was the M20, listed here last; correct? 3 A. Correct. 4 Q. Okay. And that media is shown here as 58 5 percent at three microns; correct? 6 A. It is shown as 58. 7 Q. Okay. And have you reviewed any testing 8 yourself that reflects these numbers? 9 A. We have data sheets from the media 10 manufacturers that provide a penetration value, and 11 I've seen those. 12 Q. In your opinion, more likely than not, is 13 this an accurate reflection of the efficiency of this 14 filter media? 15 MR. GOSS: Object to form. 16 A. I believe these are lower values than was 17 demonstrated by the data sheets from the media 18 supplier. 19 Q. Okay. 20 MR. GOSS: This has been marked before; 21 hasn't it? 22 MR. BANKSTON: It sure has, and I don't know 23 the number so I'm going to dup it. 24 MR. GOSS: All right. 25 MR. BANKSTON: I'm unfortunately going to</p>
<p style="text-align: right;">Page 23</p> <p>1 per minute; correct? 2 A. Correct. 3 Q. Is that pretty much the -- the standard DOP 4 testing parameters, or was there something special 5 about this test? 6 A. Those appear to be standard from what I've 7 seen. 8 Q. Okay. When it talks about the M03 media, it 9 gives an efficiency of 99.97 percent at .3 microns; 10 correct? 11 A. Correct. 12 Q. Is that consistent with a HEPA rating? 13 A. That would be the definition of a HEPA 14 rating. 15 Q. Okay. Now the next filter is the M10 media, 16 which is labeled here as 90 percent at .3 microns; 17 correct? 18 A. Correct. 19 Q. Now that is the filter that Pentair was 20 initially providing to the company for use in the Bair 21 Hugger; correct? 22 MR. GOSS: Object to form. 23 A. My understanding is that was in some of the 24 filters initially, but the 750 or 775 did not have 25 that media.</p>	<p style="text-align: right;">Page 25</p> <p>1 have a few of those today. 2 (Exhibit 374 was marked for 3 identification.) 4 BY MR. BANKSTON: 5 Q. Dr. Crowder, I've handed you Exhibit 374, 6 which appears to be some filter testing. Have you 7 ever seen this before? 8 A. I was shown this earlier this week as part 9 of the preparation. I had not seen it before then. 10 Q. Okay. If we look at the bottom of this 11 chart, do you see that there is a -- a line graph of 12 filter efficiency? 13 A. I see what appears to be a couple lines. 14 Q. Okay. And I'm looking -- 15 Do you see how, along the bottom of the 16 chart, there are particle sizes? 17 A. Yes, I see that. 18 Q. And then on the -- the Y axis of the chart 19 there's some efficiency percentages? 20 A. Yes, I see that. 21 Q. So we can look at this chart if we want to 22 and see what it is indicating at three microns. Do 23 you see where the three-micron line is? 24 A. The three micron? 25 Q. Correct.</p>

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<p style="text-align: right;">Page 26</p> <p>1 MR. GOSS: Object to form. 2 MR. BANKSTON: Oh, excuse me. 3 MR. GOSS: Point three? 4 MR. BANKSTON: I'm -- you're absolutely 5 right. Peter already knows what I was trying to get 6 at here. 7 Q. I'm actually directing you, can you look for 8 us at .3 microns. 9 A. Yes, I see .3 microns. 10 Q. Okay. And would you agree with me that in 11 this testing, that at .3 microns the filter is 12 performing right at close to 58 percent efficiency? 13 A. At .3 micron -- 14 MR. GOSS: Object to form. 15 A. -- it seems to show somewhere in the range 16 of 55 to 60, depending on which line. Maybe even a 17 little above. It's hard to tell for sure. 18 Q. Okay. In other words, the results from this 19 filter testing that's in front of you is reasonably 20 similar to the results that we viewed in Ms. 21 Lastovich's e-mail in the previous exhibit; correct? 22 MR. GOSS: Object to form, foundation. 23 MR. NEILSON: Objection, misstates his 24 testimony. 25 A. Are you asking if the percentage number</p>	<p style="text-align: right;">Page 28</p> <p>1 where the indicator is for .2 micron? 2 A. Yes, I can. 3 Q. Okay. And here we are seeing that at .2 4 micron, this filter is somewhere at or below 50 5 percent; correct? 6 MR. GOSS: Object to form, foundation. 7 A. It appears in this data to be around 50 8 percent. 9 Q. We had discussed, with respect to the M10 10 filter, that you were aware that it had been marketed 11 to the public or represented to the public as a .2- 12 micron filter, and I'm wondering with respect to the 13 M20, were you aware of what its public designation 14 was? 15 MR. GOSS: Object to form. 16 MR. NEILSON: Objection, misstates his 17 testimony as far as when in time he was aware. He 18 reviewed documents in preparation for the deposition 19 and he saw the .2, -- 20 MR. BANKSTON: Excellent. Okay. Let's -- 21 MR. NEILSON: -- so that's -- that's why I 22 objected earlier because -- 23 MR. BANKSTON: Absolutely. 24 MR. NEILSON: -- it wasn't clear what -- 25 MR. BANKSTON: Let's get that clear on the</p>
<p style="text-align: right;">Page 27</p> <p>1 given previously is similar to the percentage shown 2 here? 3 Q. Correct, as respects to .3 microns. 4 A. It seems to be a similar number. 5 Q. Okay. Do you know who Camfil Farr is? Have 6 you heard that name before? 7 A. No. 8 Q. Okay. And then if you can check on to the 9 second page for me, do you see at the top right corner 10 there's an editor's name that is S. Eggert? Do you 11 happen to know who that individual is? 12 A. No, I don't. 13 Q. Okay. From -- 14 While working at Pentair, have you ever seen 15 an efficiency test that matched this format before? 16 A. No. 17 Q. Okay. Do you have an opinion sitting here 18 today about whether this testing was conducted by 19 Pentair or at Pentair's request? 20 A. I did not find any test reports like this in 21 our files, -- 22 Q. Okay. 23 A. -- so I have no reason to believe it was 24 done by us. 25 Q. On this graph on the first page, can you see</p>	<p style="text-align: right;">Page 29</p> <p>1 record really quick. 2 Q. When it comes to how Arizant, Augustine 3 Medical or 3M has publicly described their filter, was 4 that information that you had before you prepared for 5 this deposition? 6 A. No. 7 Q. Okay. In other words, the first time that 8 you became aware that the filter was being described 9 publicly as a .2-micron filter was when you began to 10 prepare for this deposition. 11 A. Correct. 12 Q. Okay. Does Pentair/Porous Media have a way 13 that it describes the fil -- the M10 or M20 filter 14 besides simply M10 and M20? Is there a nomenclature 15 that's used? 16 A. The M10 or M20 would be how we would 17 describe that media. 18 Q. Okay. Now have you heard of filters being 19 described with -- with -- with particulate size as the 20 reference of how it's described; for instance, a one- 21 micron filter, a .5-micron filter, et cetera? 22 A. Yes, I have heard of that. 23 Q. Okay. With respect to the M10 media, which 24 we saw from some results earlier was being shown by 25 Ms. Lastovich to filter out 90 percent of particles at</p>

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<p>1 .2 microns, that filter -- you would agree with me 2 it's appropriate to call that filter a .2-micron 3 filter?</p> <p>4 A. I am not aware of a technical definition for 5 when a filter could be called a -- for instance, a .2- 6 micron filter or when it would not be. That is, from 7 what I've seen, a marketing approach. A scientific 8 approach would be to describe a particular efficiency 9 of removal at a -- under a particular set of 10 conditions.</p> <p>11 Q. Okay. When you at Pentair market filters, 12 do you ever market them as -- by -- by their 13 particulate-size rating?</p> <p>14 MR. NEILSON: Objection, foundation.</p> <p>15 A. It's possible that we have done that as 16 well.</p> <p>17 Q. If Pentair was going to market or 18 communicate about a filter and refer to it as a .2- 19 micron filter, would I be correct in assuming that 20 that designation would only be used if that filter was 21 capable of at least filtering out a majority of 22 particles at .2 microns?</p> <p>23 MR. NEILSON: Objection, foundation.</p> <p>24 A. That goes back to a -- a marketing approach. 25 A .2-micron particle is extremely small, and so we</p>	<p>1 and this is a discussion of that grade, which is used 2 on these following part numbers. Are you familiar -- 3 Have you seen those part numbers before?</p> <p>4 A. Yes, I have.</p> <p>5 Q. Okay. And those correspond to various Bair 6 Hugger models; correct?</p> <p>7 A. Yes, I believe they do.</p> <p>8 Q. Okay. In this e-mail Ms. Lastovich says 9 that the media is rated 93 percent efficient at .2 10 microns. Do you know where she got that information 11 from?</p> <p>12 A. I do not.</p> <p>13 Q. Okay. Next it discusses the M20 grade and 14 says, "We do not have a published efficiency at .2 15 micron with this media..."</p> <p>16 Do you know if she's correct there, if the 17 company at that time did not have any published 18 efficiency?</p> <p>19 A. I am not aware of one.</p> <p>20 Q. Okay. In the top e-mail from Mr. Zgoda it 21 states that, in the middle paragraph, "It may pay to 22 have some 750094 filter samples made using the M10 23 media if we can."</p> <p>24 Do you know if filter samples with the M10 25 media were ever tried for the 75099 -- excuse me --</p>

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<p>1 A. If they did, it would have been on a 2 prototype scale. I'm not aware of a changeover or a 3 large-scale production.</p> <p>4 Q. Okay. Now there have been times when 5 Arizant or 3M have approached Porous Media or Pentair 6 about improving the efficiency of the Bair Hugger 7 filter.</p> <p>8 A. There have been times they've asked about 9 other medias.</p> <p>10 Q. Well there have been, in fact, times when 11 Porous Media has worked with Arizant, 3M and other 12 outside vendors on filter projects and the creation of 13 prototypes; correct?</p> <p>14 A. Correct.</p> <p>15 Q. Okay. And Porous Media knew at that time 16 and Pent -- or Pentair, depending on what time period 17 we're talking about --</p> <p>18 In fact, let's separate it out. There have 19 been numerous attempts over the years in which 20 discussions have been had between the makers of the 21 Bair Hugger and your company with regard to improving 22 filtration efficiency.</p> <p>23 MR. GOSS: Object to form.</p> <p>24 A. There have been numerous conversations 25 around changing filter efficiency.</p>	<p>1 entity owns it or has purchased it? Does that make 2 sense to you?</p> <p>3 A. Yes, it does.</p> <p>4 Q. Okay. So, for instance, there may be times 5 that we're going to talk in this deposition about 6 things that happened in the 2013-2016 time period, and 7 I understand it's not typical to refer to your company 8 as Porous Media during those time periods.</p> <p>9 A. Correct.</p> <p>10 Q. Okay. But for the purpose of this 11 deposition, can we just say "Porous Media?" Is that 12 going to be fine?</p> <p>13 A. Yes.</p> <p>14 Q. Okay.</p> <p>15 A. That's fine.</p> <p>16 MR. NEILSON: And I will also for the 17 record, from what I understand, the company was still 18 referred to as Porous Media even after Pentair 19 purchased it.</p> <p>20 MR. BANKSTON: Okay.</p> <p>21 MR. NEILSON: It was simply a -- a brand 22 change, so to speak, at some later period where it was 23 now Pentair, but it was -- internally they consider 24 themselves Porous Media.</p> <p>25 MR. BANKSTON: Right. Right.</p>
<p>1 MR. NEILSON: And Mark, can I interject just 2 for a second --</p> <p>3 MR. BANKSTON: Uh-huh.</p> <p>4 MR. NEILSON: -- just for consistency? 5 Because sometimes you say "Pentair," sometimes you 6 say -- say "Porous Media," --</p> <p>7 MR. BANKSTON: Media, right.</p> <p>8 MR. NEILSON: -- sometimes you say "Pentair 9 or Porous Media," and, you know, perhaps for the 10 purpose of the deposition you can just say "Porous 11 Media." That way we don't need to worry about at what 12 point did Pentair own Porous Media.</p> <p>13 MR. BANKSTON: I agree.</p> <p>14 MR. NEILSON: I've -- I've tried not to 15 object because I know --</p> <p>16 MR. BANKSTON: Yeah, I know. Absolutely.</p> <p>17 MR. NEILSON: -- it's not what you're 18 getting at, I don't want to be obtrusive, but at least 19 that way the record's more clear.</p> <p>20 MR. BANKSTON: Yeah. If --</p> <p>21 Q. In fact, let me put it on the record for 22 you, doctor.</p> <p>23 When I say "Porous Media," can we agree that 24 I'm talking about the entity that has always provided 25 those Bair Hugger filters regardless of whatever</p>	<p>1 MR. NEILSON: So --</p> <p>2 MR. BANKSTON: We have similar situations on 3 both sides here on -- with that. We've dealt with 4 that issue before here in this case.</p> <p>5 Q. All right. So for simplicity sake, we're 6 just going to talk about Porous Media from here on 7 out.</p> <p>8 A. Sure.</p> <p>9 Q. And the first --</p> <p>10 First of all, I want to ask you: You 11 understand that there was a Bair Hugger model 505 in 12 the period of the '90s that Porous Media was providing 13 a filter for.</p> <p>14 A. Correct.</p> <p>15 Q. And then we looked at a document regarding 16 what was referred to as the next-generation warming 17 unit, and that was what eventually became the 750, 18 another prod -- product that Porous Media provided a 19 filter for.</p> <p>20 A. Okay.</p> <p>21 Q. Okay? When -- when the 750 was being 22 developed back in the '90s, do you have any 23 knowledge -- does Pentair know if there was ever an 24 attempt to use a HEPA filter for that device?</p> <p>25 A. I don't know of an attempt at the HEPA -- at</p>

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<p>1 HEPA filter efficiency for that filter at that time. 2 Q. Okay. I want to move forward, then, to the 3 date of some of the documents we've been looking at 4 today, which is the 2008-2009 time period. 5 Are you familiar during that time period of 6 Arizant reaching out to Porous Media regarding a 7 filtration-improvement project? 8 A. Yes. 9 Q. Okay. Do you remember or do -- does Porous 10 Media know what the goals of that filtration project 11 were? 12 A. No. 13 Q. Okay. 14 (Exhibit 376 was marked for 15 identification.) 16 BY MR. BANKSTON: 17 Q. All right, Dr. Crowder, I've handed you an 18 e-mail from Karl Zgoda to Wendy Lastovich at Porous 19 Media from July of 2008, and in this e-mail there is a 20 discussion of the filtration project that Arizant was 21 interested in at the time, and I want to go through a 22 couple of the sentences here and -- and talk about 23 what you may have been able to figure out about some 24 of this stuff. 25 The first is: When Mr. Zgoda in the first</p>	<p>Page 38</p> <p>1 was handled through Wendy Lastovich. 2 Q. Okay. So in other words, while you may have 3 some interaction later in that year, in terms of 4 what -- the conversation being discussed in this 5 e-mail and what the -- what Mr. Zgoda's newfound, 6 urgent interest is, Porous Media can't speak with 7 authority as to what that was. 8 A. Correct. 9 Q. Okay. Now the second paragraph discusses 10 investigating adding filtration at the end of Bair 11 Hugger hoses after the warming unit, right before the 12 air enters the disposable blanket. Has -- 13 Did Porous Media ever develop a prototype 14 along those lines? 15 A. We -- 16 MR. NEILSON: Objection, foundation as to 17 Porous Media developing the prototype. 18 MR. BANKSTON: Okay. 19 MR. NEILSON: I don't think that's what he 20 meant. 21 A. We built a number of filters around that 22 time. To my understanding, all of them were in our 23 traditional panel-filter configuration. We did 24 theoretical calculations for other options. 25 Q. Okay. For -- for lack of a better way to --</p>
<p>1 paragraph, second line, says, "I have a newfound, 2 urgent interest in what we discussed and like to see 3 if we can get together very soon to discuss some 4 filtration topics with you and your technical 5 experts," Pentair today does not know what that 6 newfound, urgent interest was. 7 A. Today, or at that time period? 8 Q. Well let's -- let's do them both really 9 quick and let's do it -- have you -- 10 Have you had a chance to speak with Ms. 11 Lastovich in preparation for this deposition? 12 A. No. 13 Q. Okay. So -- and you were -- 14 Were you personally involved in the 15 discussion that's being talked about in this e-mail? 16 A. I became involved in this project somewhere 17 around the August timeframe, just after this. 18 Q. Okay. So if you were going to find out 19 anything about what was being discussed in this 20 e-mail, it would have to either be through Ms. 21 Lastovich or perhaps some sort of corporate record at 22 Pentair; correct? 23 A. I did meet with Arizant in August, we went 24 over to visit them, and so I had some personal 25 interactions at that time. Most of the communication</p>	<p>Page 39</p> <p>1 to say this, when it -- when it comes to HEPA 2 filtration during this project, could you get it to 3 work? 4 MR. GOSS: Object to form. 5 A. We built a number of prototypes with HEPA 6 media in the flat-panel configuration. We had a great 7 deal of difficulty getting filters that would test at 8 HEPA filtration with that media. 9 Q. Okay. In those investigations, were -- I -- 10 I take it you were limited by the existing design 11 dimensions of the Bair Hugger and how it integrated 12 its filter; is that correct? 13 MR. GOSS: Object -- object to form. 14 A. We built filters in a couple of the 15 established configurations. We discussed other 16 configurations. 17 Q. Okay. When you make the distinction between 18 having built some but only discussed others, am I 19 taking it that when you're talking about new 20 configuration sizes and dimensions for the filter, 21 none of those were carried forward into a prototype 22 stage? 23 A. Correct. 24 Q. Okay. 25 (Exhibit 377 was marked for</p>

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<p>1 identification.)</p> <p>2 BY MR. BANKSTON:</p> <p>3 Q. Dr. Crowder, I've shown you Exhibit 377,</p> <p>4 which is another communication between Porous Media</p> <p>5 and Arizant Healthcare regarding the filter</p> <p>6 prototypes, and I'd like to start first with the</p> <p>7 bottom e-mail on this page from Mr. Barrows at</p> <p>8 Arizant, and the very first thing on these pages is a</p> <p>9 discussion of a prototype deeper M03, and when he</p> <p>10 talks about a deeper M03, can you tell me what that</p> <p>11 means?</p> <p>12 A. I believe he's talking about a greater pleat</p> <p>13 height so that the filter has a greater depth.</p> <p>14 Q. Now Mr. Barrows in this e-mail talks about</p> <p>15 two design targets right off the bat, the first design</p> <p>16 target being match the pressure drop of the current</p> <p>17 M20 using M03 media. Do you see that?</p> <p>18 A. Yes.</p> <p>19 Q. Okay. And the second design target being</p> <p>20 use the same footprint, which he describes as 4.9 by</p> <p>21 6.9, and to make it deeper as needed.</p> <p>22 In the next e-mail, do you see where Ms.</p> <p>23 Lastovich discusses those two design targets?</p> <p>24 A. Yes.</p> <p>25 Q. Okay. And she describes them as mutually</p>	<p>Page 42</p> <p>1 device versus filters for the in-line hose.</p> <p>2 Q. Okay. Let's -- let's -- in fact, let's have</p> <p>3 this discussion away from this document, from -- just</p> <p>4 apart from this document. If you -- if --</p> <p>5 If, as a result of Porous Media's</p> <p>6 investigations in the 2008-2009 time period, would it</p> <p>7 be correct to say that you could not integrate a HEPA</p> <p>8 filter and achieve the same pressure drop without some</p> <p>9 kind of a redesign of the device?</p> <p>10 A. Yes.</p> <p>11 Q. Okay. Has 3M/Arizant, have they ever</p> <p>12 expressed any interest to Porous Media about</p> <p>13 redesigning the device so that it could accommodate a</p> <p>14 HEPA filter?</p> <p>15 MR. GOSS: Object to form.</p> <p>16 A. They asked us about a number of different</p> <p>17 filter configurations. I don't know about the design</p> <p>18 of their device.</p> <p>19 Q. Okay. Okay. With respect to the M10 filter</p> <p>20 media, that filter media has undergone a change</p> <p>21 approximately in the 2009 time period; is that right?</p> <p>22 A. Correct.</p> <p>23 Q. Okay. The -- the new version is still known</p> <p>24 as the M10 filter media?</p> <p>25 A. Correct.</p>
<p>Page 43</p> <p>1 exclusive. Can you tell us what she means by that?</p> <p>2 A. I'm not certain what she meant by that.</p> <p>3 Q. Okay. This e-mail then references some</p> <p>4 involvement that you had getting involved in this</p> <p>5 project, and that was on some testing with some</p> <p>6 laboratories. Do you know what it was that you were</p> <p>7 going to have tested for Arizant at that point?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. What was it that you were having</p> <p>10 tested?</p> <p>11 A. We were testing the filtration efficiency of</p> <p>12 the 775 or 750 filter.</p> <p>13 Q. Okay. This was at this -- and when you say</p> <p>14 the 7 --</p> <p>15 You mean the one that was currently being</p> <p>16 used on the device?</p> <p>17 A. We tested both the current product and a</p> <p>18 number of variation prototypes.</p> <p>19 Q. Okay. Now am I correct in the conclusion</p> <p>20 that the integration of a HEPA filter on the device in</p> <p>21 order to achieve the pressure drop that Arizant wanted</p> <p>22 for the device, it would have required a redesign of</p> <p>23 the device in order to make a HEPA filter work?</p> <p>24 MR. GOSS: I'm going to object to form. I'm</p> <p>25 not sure that we're talking about filters for the</p>	<p>Page 44</p> <p>1 Q. But they have different performance</p> <p>2 characteristics; correct?</p> <p>3 A. Slightly, yes.</p> <p>4 Q. Okay. In other words, one of the things</p> <p>5 that is different about the M10 filter manufactured up</p> <p>6 until 2008-2009 and the M10 filter manufactured after</p> <p>7 is that the one that was manufactured after resulted</p> <p>8 in a greater amount of pressure drop on the Bair</p> <p>9 Hugger unit.</p> <p>10 A. My --</p> <p>11 MR. NEILSON: Objection, vague as to time,</p> <p>12 because you make the suggestion that Porous Media was</p> <p>13 selling the M10 with the greater pressure drop after</p> <p>14 2009.</p> <p>15 MR. BANKSTON: Gotcha. Yeah. Yeah.</p> <p>16 Q. Let's back it up and take this as one piece</p> <p>17 at a time. There was a time in which Porous Media was</p> <p>18 selling the M10 filter for the Bair Hugger 505 unit</p> <p>19 between the late '90s to 2008-2009.</p> <p>20 A. Correct.</p> <p>21 Q. Okay. And you're familiar with that filter</p> <p>22 and its characteristics.</p> <p>23 A. Correct.</p> <p>24 Q. Okay. At a later date, 2 -- into 2008-2009,</p> <p>25 there was a change in the formulation or the</p>

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<p style="text-align: right;">Page 46</p> <p>1 configuration for the filter media of the M10 media. 2 A. Yes. 3 Q. Okay. After that change had occurred, 4 Porous Media provided samples of that new media to 5 Arizant Healthcare. 6 A. Correct. 7 Q. And Porous Media became aware that when 8 Arizant tried to use those samples in the 505 device, 9 it caused a greater amount of pressure drop in that 10 device. 11 A. Correct. 12 Q. And Arizant let Porous Media know that they 13 found that pressure drop to be unacceptable for use in 14 the device; correct? 15 A. Correct. 16 Q. Okay. Can you describe to me how the M10 17 filter changed? What was it that actually changed 18 about it? 19 A. My understanding is that the media that we 20 had been using up to that point was discontinued -- 21 Q. Okay. 22 A. -- and we had to find one that was 23 equivalent. 24 Q. Now when you talk about the media being 25 discontinued, the media is not something that's</p>	<p style="text-align: right;">Page 48</p> <p>1 Q. Okay. Ultimately, it was Arizant itself who 2 requested the changeover to the M20 media. 3 A. Correct. 4 Q. Okay. Did Porous Media ever make any 5 representation about the effect or lack thereof of the 6 change of the media on the safety of the device 7 clinically speaking? 8 A. Not that I know of. 9 Q. Okay. In terms of the differences between 10 the M10 and M20 media, of how they -- how airflow 11 flows through them, do those filters have a different 12 density to them? 13 MR. GOSS: Object to form. 14 A. I don't know if the density is different. 15 Q. Okay. In other words, the -- there's a way 16 in which the M10 performs differently than the M20. 17 You understand that. 18 A. Correct. 19 Q. Do you know structurally or from an 20 engineering standpoint what it is that is different 21 about the filters that makes them perform differently? 22 A. Yes. 23 Q. Okay. Can you explain that to us. 24 A. The M10 media would have a mean flow pore 25 size of approximately 10 microns, the M20 would have a</p>
<p style="text-align: right;">Page 47</p> <p>1 manufactured in-house at Porous Media? 2 A. Correct. 3 Q. Okay. When you -- 4 When the company informed Porous Media that 5 the M10 -- new M10 filter media was unacceptable for 6 use in the Bair Hugger, did Porous Media have any 7 specific -- 8 MR. NEILSON: Objection, vague as to 9 "company." 10 MR. BANKSTON: Ahh, let's -- I keep doing 11 that. Yup. Let's -- let's start -- do it this way. 12 Q. When -- when Arizant let Porous Media know 13 that that M10 filter was producing an unacceptable 14 level of pressure drop, did Porous Media have any 15 recommendations about alternative medias or solutions 16 to that problem? 17 A. Not that I know of. 18 Q. Okay. Now after that filter change in the 19 M10 media, Arizant began to purchase the M20 media for 20 use in that product, the 505 unit. 21 A. Correct. 22 Q. Okay. And in fact Arizant had already been 23 purchasing that M20 media for use in the 750 for 24 several years. 25 A. Correct.</p>	<p style="text-align: right;">Page 49</p> <p>1 mean flow pore size of approximately 20 microns. 2 Q. Okay. Is that -- 3 And I take it that's where the designation 4 M10 and M20 come from. 5 A. Yes. 6 Q. Okay. Now I want to talk to you about -- 7 You understand what I mean when I say the 8 words "bacterial contamination?" Do you understand 9 what that means? 10 A. I guess. 11 MR. GOSS: Object to form, foundation. 12 Q. Has Arizant or 3M had any conversations with 13 Porous Media with regards to bacterial contamination? 14 MR. NEILSON: Objection, foundation. 15 A. In searching through the e-mails, I found 16 where Wendy had talked about bacterial capture of 17 filter media. 18 Q. Okay. Do you know what context she was 19 speaking of that? And by that I mean do you know what 20 time period and reason she was talking about those 21 topics? 22 A. I believe it was in the 2008-2009 period, 23 but I'm not certain, and I don't know the context. 24 Q. Okay. 25 MR. BANKSTON: There we go. This one's</p>

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<p>1 premarked. All right.</p> <p>2 BY MR. BANKSTON:</p> <p>3 Q. All right, Dr. Crowder, I've shown you</p> <p>4 what's been previously marked as Exhibit 176, and</p> <p>5 these are a list of filtration topics produced</p> <p>6 internally at Arizant, and I'd like to ask you about a</p> <p>7 couple of these.</p> <p>8 The first that I see on this list that</p> <p>9 mentions Porous Media, do you see that on the second</p> <p>10 bullet point?</p> <p>11 A. Yes.</p> <p>12 Q. Okay. That line reads, "Porous Media's</p> <p>13 experience dealing with filtration of bacteria in</p> <p>14 non-ventilator type systems."</p> <p>15 Do you know if Porous Media ever had</p> <p>16 discussions with Arizant or 3M about this topic?</p> <p>17 A. The e-mail that Wendy sent was in relation</p> <p>18 to bacteria in a non --</p> <p>19 Oh. That was a ventilator application. So</p> <p>20 no, I don't know.</p> <p>21 Q. Okay. Do you know sitting here today,</p> <p>22 can -- can you give us any kind of description of what</p> <p>23 Porous Media's experience in dealing with the</p> <p>24 filtration of bacteria generally is?</p> <p>25 A. Most of our experience in dealing with</p>	<p>1 Q. Okay. The next bullet point on this Exhibit</p> <p>2 176 discusses the size of typical airborne bacteria.</p> <p>3 Does -- does Porous Media have any knowledge relating</p> <p>4 to that?</p> <p>5 A. We have some.</p> <p>6 Q. Okay. Do you know the typical size of</p> <p>7 airborne bacteria?</p> <p>8 A. My understanding is that bacteria, in order</p> <p>9 to survive, needs to be in water, needs to be kept</p> <p>10 wet, so my experience with testing for removal of --</p> <p>11 bacteria in airflows has been to remove droplets of --</p> <p>12 of water with bacteria in them.</p> <p>13 Q. Okay. So in terms of, say, what size staph</p> <p>14 bacteria can be free-floating in air in an operating</p> <p>15 room, that's not something Porous Media has direct</p> <p>16 knowledge about.</p> <p>17 A. No.</p> <p>18 Q. Okay. On the next question it talks about</p> <p>19 how much bacteria can be allowed to pass through and</p> <p>20 how much is dangerous. Do you know if these questions</p> <p>21 were ever asked of Porous Media?</p> <p>22 A. I am not aware of them being asked.</p> <p>23 Q. Okay. Is Porous Media even in a position to</p> <p>24 be able to answer those questions with any sort of</p> <p>25 clinical authority?</p>

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<p style="text-align: right;">Page 54</p> <p>1 done in terms of pressure drop versus these two types 2 of filters?</p> <p>3 MR. GOSS: Objection, form.</p> <p>4 A. My understanding is that both of the filter 5 medias or -- that we have supplied would be capable of 6 removing bacteria.</p> <p>7 Q. Does --</p> <p>8 Is it Porous Media's position that the 9 filters supplied are capable of removing 100 percent 10 of bacteria from the airstream?</p> <p>11 A. I'm not aware of any filter capable of 12 removing a hundred percent --</p> <p>13 Q. Okay.</p> <p>14 A. -- of a challenge.</p> <p>15 Q. Okay. For instance, when we talk about HEPA 16 filtration, --</p> <p>17 A. Yes.</p> <p>18 Q. -- we -- we were talking about at .3 microns 19 that it's 99.97 percent; correct?</p> <p>20 A. Correct.</p> <p>21 Q. So what we can see there is -- is -- I guess 22 that's 300ths of a percent particles can travel 23 through that filter at .3-micron size.</p> <p>24 A. Correct.</p> <p>25 Q. Okay. As that filter goes higher in</p>	<p style="text-align: right;">Page 56</p> <p>1 bacteria standards?"</p> <p>2 Even up to the present, is Porous Media 3 familiar with any such standards?</p> <p>4 A. No.</p> <p>5 Q. Okay. Now when it comes to the relationship 6 between Porous Media and 3M, does Porous Media have 7 any responsibilities at all for maintaining clinical 8 effectiveness and safety of that Bair Hugger unit?</p> <p>9 MR. GOSS: Objection.</p> <p>10 A. We have a responsibility to supply filters 11 that meet the specifications discussed between 3M and 12 Porous Media --</p> <p>13 Q. Sure.</p> <p>14 A. -- or Pentair.</p> <p>15 Q. Let me put it this way: Is it -- is it part 16 of the responsibilities and things set out in y'all's 17 relationship, would -- in that -- in that agreement is 18 there ever times in which Porous Media is expected to 19 question or doubt 3M's judgment or selection of 20 products for their device?</p> <p>21 A. No.</p> <p>22 MR. GOSS: Objection.</p> <p>23 MR. BANKSTON: All right. I guess can we 24 take a short break.</p> <p>25 THE REPORTER: Off the record, please.</p>
<p style="text-align: right;">Page 55</p> <p>1 particle sizes, as we approach one- and two- and 2 three-micron particle sizes, would you agree with me 3 that a -- that a HEPA filter is, for all intents and 4 purposes, 100 percent effective at filtering out 5 one-to-three-micron particles?</p> <p>6 A. I would say that it is highly efficient, it 7 is very good at removing; I would not use the phrase 8 "100 percent."</p> <p>9 Q. Okay.</p> <p>10 A. It's not something we would use in relation 11 to our medical filters.</p> <p>12 Q. Okay. So is it -- is it your testimony that 13 any -- any filter efficiency that's represented as a 14 hundred percent is not ever going to be truly 100 15 percent?</p> <p>16 A. Yes. I would be uncomfortable with stating 17 100 percent.</p> <p>18 Q. Okay. Do you have any understanding sitting 19 here today about the percentage of common airborne 20 bacteria that can be filtered out by the various 21 filters that are used in Bair Hugger units?</p> <p>22 A. No.</p> <p>23 Q. Okay. One of --</p> <p>24 The last bullet point here on Exhibit 176 25 is, "Is Porous Media familiar with any bacter -- OR</p>	<p style="text-align: right;">Page 57</p> <p>1 (Recess taken.)</p> <p>2 BY MR. BANKSTON:</p> <p>3 Q. All right, Dr. Crowder, before we took a 4 break we were talking about the 2008-2009 time period 5 in which there was some investigations being done on 6 the filters for the Bair Hugger product, and I kind of 7 want to summarize how that -- how that ended.</p> <p>8 I understand that there were investigations 9 into various configurations of filters with higher 10 efficiencies for the Bair Hugger; correct?</p> <p>11 A. Correct.</p> <p>12 Q. But I believe that we -- we were able to 13 establish that the integration of a HEPA filter would 14 likely require a redesign of the device. Do you 15 remember that testimony?</p> <p>16 A. It seems likely. I don't know what would be 17 required for their device.</p> <p>18 Q. Okay. And during this filter project, 19 Pentair understood from that filter project that 3M -- 20 excuse me. Let me start that over because of the time 21 period.</p> <p>22 Porous Media knew during the course of that 23 filter project or had received information from 24 Arizant that indicated that Arizant did have a concern 25 in this project about bacterial contamination.</p>

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<p style="text-align: right;">Page 58</p> <p>1 MR. GOSS: Object to form, foundation. 2 A. I don't know that we did. 3 Q. Okay. Certainly, we understand that 4 bacterial contamination was an issue discussed in the 5 context of this filter project. 6 MR. NEILSON: Objection, vague as to whom it 7 was discussed between. 8 MR. BANKSTON: Okay. 9 Q. We -- we do understand that, in the course 10 of Pentair -- excuse me -- in the course of Porous 11 Media's work with Arizant in this 2008-2009 filter 12 project, there were employees of Porous Media who were 13 in some context discussing bacterial contamination. 14 A. Correct. 15 Q. Okay. The final result of this project, was 16 there any actions taken at Porous Media with regard to 17 the parts that it supplied for the Bair Hugger? 18 A. No. 19 Q. Okay. 20 MR. NEILSON: Objection, vague. Also 21 misstates the testimony. 22 Q. Following the 2009 filter project, did 23 Porous Media continue to provide the same M20 filter 24 for use in the Bair Hugger unit? 25 A. Correct.</p>	<p style="text-align: right;">Page 60</p> <p>1 deposition? I'm not sure if I did. 2 MR. NEILSON: (Shaking head.) 3 MR. BANKSTON: Okay. I don't need to go 4 into this. That's all right. 5 MR. NEILSON: We will stipulate we've never 6 heard of Project Ducky. 7 MR. BANKSTON: Okay. That's -- yeah, 8 Another one -- 9 Let me go ahead and get that on the record 10 real quick. 11 Q. One of the topics in your deposition notice 12 of the topics that we had planned to discuss here 13 today was communications between Porous Media and 14 Arizant or 3M relating to something called Project 15 Ducky. Do you remember seeing that topic? 16 A. Yes, I saw that. 17 Q. Okay. Does Porous Media today have any 18 knowledge or understanding about what Project Ducky 19 is? 20 A. No. 21 Q. Okay. I want to move forward just a little 22 bit. Let me ask it this way: After the 2009 filter 23 discussions between the companies regarding possible 24 filtration improvements, were there any other 25 occasions that Porous Media knows of in which Porous</p>
<p style="text-align: right;">Page 59</p> <p>1 Q. Okay. In -- in the deposition notice that 2 you received there were some topics, obviously, that 3 we were going to talk about today, and one of the 4 entities mentioned in those topics is an entity called 5 IDEO. Do you remember seeing that? 6 A. Yes, I do. 7 Q. Okay. In -- in preparing for this 8 deposition, did you come to find out if Porous Media 9 has ever had any communications with IDEO about the 10 Bair Hugger products? 11 A. We did. 12 Q. Okay. Can you describe to me what that was? 13 A. We searched through our files and we found 14 several e-mail chains of communications between then 15 Porous Media and IDEO. 16 Q. Okay. Can you summarize the basic subject 17 matter of the communications with IDEO? 18 A. They seemed to be around options for 19 different filter design. 20 Q. Okay. Do you know the -- the time period of 21 the conversations with IDEO? 22 A. I don't without looking at those again. 23 Q. Yeah. We might need to -- to check on that. 24 MR. BANKSTON: Before I break this out, is 25 this something that I -- was provided y'all before the</p>	<p style="text-align: right;">Page 61</p> <p>1 Media and Arizant or 3M engaged in discussions or 2 projects aimed at a potential improvement of 3 filtration efficiency? 4 MR. GOSS: Object to form. 5 A. There was apparently an offer of a HEPA 6 media that I saw in preparation for this, if that's 7 what you mean by "improvement of filtration." 8 Q. Let's talk a little bit about that. When 9 you say "an offer of HEPA media," who was making the 10 offer? 11 A. There was a price quote from Pentair to 3M. 12 MR. BANKSTON: Okay. Let's take a look at 13 that real quick. 14 (Exhibit 378 was marked for 15 identification.) 16 BY MR. BANKSTON: 17 Q. Dr. Crowder, I've put in front of you 18 Exhibit 378, which is an August 7th, 2013 price quote. 19 Is this the document you were referring to? 20 A. Yes. 21 Q. Okay. In this time in -- in 2013, do you 22 know what -- beyond this quote, if there was any sort 23 of projects or working together with the companies in 24 terms of trying to create a HEPA media for the device? 25 A. I did not know about this until the</p>

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<p>1 preparation. I couldn't --</p> <p>2 When I examined our engineering files I did</p> <p>3 not see anything in this time period relating to this,</p> <p>4 so I don't know where this came from.</p> <p>5 Q. Okay. In this quote in that top paragraph,</p> <p>6 the last two sentences read, "Please note, with this</p> <p>7 new media, we want to raise potential performance</p> <p>8 changes in regards to the existing specifications.</p> <p>9 Most notably, we want to point out the pressure drop</p> <p>10 changes." Do you see where it says that?</p> <p>11 A. Yes, I see that.</p> <p>12 Q. Okay. Was this problem that's being pointed</p> <p>13 out, was this the same issue that was trying to be</p> <p>14 dealt with in 2008-2009?</p> <p>15 MR. GOSS: Object to form.</p> <p>16 A. I would imagine this is related to the fact</p> <p>17 that HEPA-grade media is likely to have a much higher</p> <p>18 pressure drop in the same filter configuration than</p> <p>19 the M20 media.</p> <p>20 Q. Okay. Did 3M ever start buying HEPA media</p> <p>21 from Pentair/Porous Media?</p> <p>22 A. Not that I know of.</p> <p>23 Q. Okay.</p> <p>24 (Exhibit 379 was marked for</p> <p>25 identification.)</p>	<p>Page 62</p> <p>1 e-mails in terms of investigating HEPA media for the</p> <p>2 Bair Hugger device?</p> <p>3 A. I'm not aware of anything going on.</p> <p>4 Q. Okay. Now in --</p> <p>5 The next e-mail of this chain is from Mr.</p> <p>6 Cuta. In his first line he talks about "...we've been</p> <p>7 making/testing some different design concepts to see</p> <p>8 where pressure drop and efficiency would be in the</p> <p>9 area of 45 cubic feet per minute air flow."</p> <p>10 When he's talking about making and testing</p> <p>11 some different design concepts, can you explain to us</p> <p>12 what that would entail?</p> <p>13 A. I don't know what he's referring to, if it's</p> <p>14 back to previous time or something he was engaging in</p> <p>15 at that time.</p> <p>16 Q. Okay. And I think if --</p> <p>17 Maybe we can put some context on this. Do</p> <p>18 you see that there was discussion in the previous</p> <p>19 e-mail of a filter discussion on April 10th? Correct?</p> <p>20 A. Correct.</p> <p>21 Q. And then Mr. Cuta's e-mail says that that</p> <p>22 testing has been occurring since our call; correct?</p> <p>23 A. Correct.</p> <p>24 Q. So from this Porous Media e-mail, it -- it</p> <p>25 seems apparent that sometime in the 2015 time period,</p>
<p>Page 63</p> <p>1 BY MR. BANKSTON:</p> <p>2 Q. All right, Dr. Crowder, I've put in front of</p> <p>3 you Exhibit 379, and this is a series of e-mails</p> <p>4 between Porous Media and 3M, and I'd like to go</p> <p>5 through these. And so because it's in chronological</p> <p>6 order, we'll kind of start at the bottom, the last</p> <p>7 page, and do you see the last page is just a</p> <p>8 signature, so we'll move on a little bit up from</p> <p>9 there, and we see in this bottom e-mail there is</p> <p>10 a -- this is an e-mail directed to Craig Cuta and Marc</p> <p>11 Shaffer.</p> <p>12 Is Marc Shaffer another employee at Porous</p> <p>13 Media?</p> <p>14 A. He was, yes.</p> <p>15 Q. Okay. So both Mr. Cuta and Mr. Shaffer are</p> <p>16 both former employees of Porous Media.</p> <p>17 A. Correct.</p> <p>18 Q. Okay. And in this e-mail he -- he asks</p> <p>19 would we have any updates on the filter discussion</p> <p>20 that we had on April 10th, and you see that the date</p> <p>21 of this e-mail is 2015; correct?</p> <p>22 A. Correct.</p> <p>23 Q. Okay. The last exhibit we saw was from 2013</p> <p>24 where a HEPA quote was provided. Do you know what if</p> <p>25 anything was done between 2013 and the times of these</p>	<p>Page 65</p> <p>1 after April 10th, there was some testing or some sort</p> <p>2 of design concepts being looked at at Porous Media.</p> <p>3 A. I am not aware of any, but it sounds like</p> <p>4 he's referring to something.</p> <p>5 Q. Okay. In the middle of the -- sort of the</p> <p>6 third line of this paragraph there's a sentence that</p> <p>7 begins, "Our efforts...", and that sentence reads,</p> <p>8 "Our efforts have been around the HEPA grade media</p> <p>9 because this will dictate the filter size since</p> <p>10 resistance will be much higher compared to the media</p> <p>11 we're currently using in the panel filter 3M purchases</p> <p>12 us -- purchases from us now."</p> <p>13 Am I correct that this statement is talking</p> <p>14 about a comparison between the HEPA media and the M20</p> <p>15 media?</p> <p>16 A. That seems likely.</p> <p>17 Q. Okay. When it talks about that the HEPA-</p> <p>18 grade media will dictate the filter size, can you</p> <p>19 explain what that means?</p> <p>20 A. If you need to achieve the same pressure</p> <p>21 drop and flow, and we're looking at HEPA-grade media</p> <p>22 as opposed to M20, it would likely require a</p> <p>23 significantly larger filter element.</p> <p>24 Q. Okay. Now in terms of what kind of filter</p> <p>25 element can be designed for the 750 as it sits today,</p>

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<p>1 the actual size of the enclosure for the filter 2 somewhat dictates the -- the size of the filter that 3 can be used on that device; correct? 4 A. I -- 5 MR. GOSS: I'm going to object, assert the 6 objection. I'm not sure this is talking about the 7 750. 8 Q. Okay. Irrespective of this document, if you 9 were going to try to -- 10 When you're talking about HEPA affecting the 11 size of the filter, that size is constrained somewhat 12 by the actual physical design of the device and its 13 filter housing. 14 A. I would imagine. 15 Q. Okay. It also states in this paragraph that 16 when it comes to HEPA, "...the cost of the filter will 17 be more than what you're paying for for your current 18 production filter." Do you agree with that statement? 19 A. Yes, I would agree with that. 20 Q. Okay. And in other words, the HEPA media 21 itself is more expensive than the media that is 22 currently being used in the Bair Hugger device. 23 MR. GOSS: Object to form. 24 A. There are a number of factors in making a 25 filter, determining the cost, one of which would be</p>	<p>1 for safety and effectiveness? 2 A. Correct. 3 Q. The next e-mail is from a gentleman named 4 Winston Tan. Do you happen to know Mr. Tan or Dr. 5 Tan? 6 A. I e-mailed back and forth with him. 7 Q. Okay. Dr. Tan's e-mail on April 23rd of 8 2015 instructs the company to "...please continue with 9 this path." And "If you can let us know a rough size 10 estimate and cost...please let me know." 11 When he's talking about a rough size 12 estimate and cost, is this going to be different than 13 what we saw in the 2013 quote for HEPA media? 14 A. I'm somewhat confused because around this 15 time we began discussions on a new product for 3M, so 16 I'm not certain whether this is in relation to simply 17 HEPA media in existing products or the new product 18 design. 19 Q. Okay. And I'll have to see. We might have 20 something that addresses that, but I hear what you're 21 saying there. 22 So basically, from the face of this document 23 you're unable to tell if these 2015 discussions relate 24 or not to a currently existing warming unit or perhaps 25 a unit that will be designed for the future.</p>

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<p>Page 70</p> <p>1 an increase in the automation of the production. That 2 would be my first call.</p> <p>3 Q. Let's talk about the final e-mail in this 4 chain, which is on the front page, and there's an 5 e-mail from a gentleman named Daniel Doran, who is an 6 engineer with 3M. In writing to Mr. Cuta, he says 7 that he's taking over the filter selection for our 8 warming units from Winston.</p> <p>9 Have you ever had any conversations with Mr. 10 Doran?</p> <p>11 A. I don't know of any.</p> <p>12 Q. Okay. This e-mail also discusses the 13 cylindrical filter currently used in the Bair Hugger 14 505, and there's some discussion about reducing costs 15 in that type of filter. Would your answer with regard 16 to how to cut costs be the same for the cylindrical 17 filter in the 505?</p> <p>18 A. The new product we're developing is closely 19 related to the 505, so I'm not sure, once again, what 20 this is questioning.</p> <p>21 (Exhibit 380 was marked for 22 identification.)</p> <p>23 BY MR. BANKSTON:</p> <p>24 Q. All right. Dr. Crowder, this is another 25 document that you've been able to review before the</p>	<p>1 table, do you know what he means there?</p> <p>2 A. Yes.</p> <p>3 Q. Okay. And what is that?</p> <p>4 A. At this time they -- 3M was creating a CS 5 document around this particular part number, we had 6 not had one previously, and he was trying to get the 7 requirements for sample size into that document.</p> <p>8 Q. When we talk about sample size, what are we 9 talking about?</p> <p>10 A. 3M was asking us to engage in lot testing 11 for the production of our filters.</p> <p>12 Q. Okay. And so that lot testing would have 13 had various samples of various sizes. Is that how 14 that works?</p> <p>15 MR. GOSS: Objection.</p> <p>16 A. Correct. Correct. Depending on the size of 17 the production lot, the table requested a different 18 number of samples to be pulled from the production lot 19 for testing.</p> <p>20 Q. Okay. Now again we're going to be talking 21 through some -- some language here that I'm just going 22 to need you help definitions on, and that is in the 23 second point under "Changes" it says that it 24 "Differentiated between Lot Release testing and 25 Quarterly testing." What's -- what is lot release</p>
<p>Page 71</p> <p>1 deposition today; correct?</p> <p>2 A. Correct.</p> <p>3 Q. Okay. This is kind of a long document, so I 4 want to go through it chronologically again. So if we 5 can go to the end here, and the first e-mail on this 6 chain is an e-mail from Dr. Tan at 3M, and in this 7 case he's -- he's writing to you as well as another 8 Porous Media employee.</p> <p>9 A. Correct.</p> <p>10 Q. Okay. Now he's talking about the feedback 11 that he received from everyone at Friday's meeting, 12 and this is a -- an e-mail from last summer, in July 13 of 2016. Do you know what meeting he's referencing?</p> <p>14 A. No.</p> <p>15 Q. Okay. When he talks about attaching the 16 revised CS document for Pentair MD 775 filter, do you 17 know what he means by "CS document?"</p> <p>18 A. Yes.</p> <p>19 Q. Okay. Tell me --</p> <p>20 Tell us what a CS document is.</p> <p>21 A. That is a document relating to the purchase 22 of a product with descriptions around the product in 23 it.</p> <p>24 Q. Okay. Now he lists some changes to the CS 25 document. When it talks about adding a sample size</p>	<p>Page 73</p> <p>1 testing and quarterly testing?</p> <p>2 A. 3M has asked us to do both lot release 3 testing, where parts are pulled from a production lot 4 and tested prior to shipment, and they've also asked 5 us to engage in quarterly testing of the production 6 parts.</p> <p>7 Q. Okay. Had --</p> <p>8 Before this time in 2016, had 3M ever asked 9 Porous Media to engage in lot testing or quarterly 10 testing?</p> <p>11 A. No.</p> <p>12 Q. Okay. Did you inquire as to why this change 13 was being made?</p> <p>14 A. No.</p> <p>15 Q. Did Porous Media know at this time that 3M 16 had been sued by hundreds of plaintiffs alleging 17 surgical-site infections?</p> <p>18 A. No.</p> <p>19 Q. When did Porous Media learn of that fact?</p> <p>20 A. I --</p> <p>21 MR. NEILSON: Objection, foundation.</p> <p>22 A. -- learned of it in discussions with our 23 attorney.</p> <p>24 Q. Okay. And that's -- that's limited to 25 what -- what you personally came to know; right?</p>

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<p>1 A. Correct.</p> <p>2 Q. In other words, there were some topics you 3 were asked to prepare for in terms of -- of you could 4 speak with the voice of the company, Pentair.</p> <p>5 A. Correct.</p> <p>6 Q. One of those was not when did you become 7 familiar with the litigation; correct?</p> <p>8 A. Correct.</p> <p>9 Q. In other words, there might be somebody in 10 Pentair who may have known about the litigation before 11 that you just don't know about.</p> <p>12 A. Possibly.</p> <p>13 Q. Okay. But at least in your conversations 14 that you were having personally with Dr. Tan, the 15 subject of litigation did not come up.</p> <p>16 A. Correct.</p> <p>17 Q. Okay. And the next e-mail is an e-mail 18 from -- from you at your Pentair address, and first of 19 all generally, before we dive into this, I -- I see 20 that there is some charts here with what appear to be 21 testing results. Is this a result of the lot testing?</p> <p>22 A. This is some data that 3M provided to us on 23 tests they had conducted on our parts.</p> <p>24 Q. Okay. In other words, this -- this chart 25 here comes from data that was generated by a third-</p>	<p>Page 74</p> <p>1 Q. Okay. So would it be accurate to say that 2 of particles of that size, .3 to one micron, that as 3 much as almost 25 percent of those particles would 4 pass through that filter?</p> <p>5 MR. GOSS: Object to form.</p> <p>6 A. Under those flow conditions, 24 percent of 7 those particles pass through those filters.</p> <p>8 Q. Okay. When we talk about the flow 9 conditions, was that matched to the actual flow of the 10 Bair Hugger unit?</p> <p>11 MR. GOSS: Object to foundation.</p> <p>12 A. I don't know.</p> <p>13 Q. Okay. All right. So it talks about that 14 two of the filters passed at 76 percent efficiency for 15 that size, it says, "where the criteria that you wish 16 to set is 75 percent." And then the following 17 sentence states, "Using your data, the Cpk is less 18 than one."</p> <p>19 Do you know what that sentence is meant to 20 say?</p> <p>21 A. The Cpk is a means of estimating how capable 22 a process is.</p> <p>23 Q. In other words, is it a statistical measure?</p> <p>24 A. Yes.</p> <p>25 Q. Okay. And when you say it's less than one,</p>
<p>1 party company.</p> <p>2 A. I believe it was third-party testing.</p> <p>3 Q. Okay. In other words, what you can say is 4 that this is not the result of Pentair/Porous Media 5 testing.</p> <p>6 A. Correct.</p> <p>7 Q. Okay. Now you write Dr. Tan, and I want to 8 try to understand what's some of being said here in 9 this first paragraph, and the first thing you say is 10 "...you have listed the acceptance number as zero 11 defects for our lot testing." What does that mean? 12 And I guess let --</p> <p>13 Actually, there's several things here that 14 could mean something in that sense, so let's break 15 them down individually. What is an acceptance number?</p> <p>16 A. A number that would be acceptable for the 17 lot of product.</p> <p>18 Q. Okay. And so the acceptance number for this 19 lot had been made as zero defects; correct?</p> <p>20 A. Correct.</p> <p>21 Q. Okay. Now it then says, "In the 30 data 22 points that you sent on your testing, two of the 23 filters pass at 76 efficiency for the .3 to one-micron 24 size...;" correct?</p> <p>25 A. Correct.</p>	<p>Page 75</p> <p>1 does that imply that there may be a reliability issue?</p> <p>2 MR. GOSS: Object to form.</p> <p>3 A. It means that there is less than three 4 standard deviations between the mean and the limit 5 being set.</p> <p>6 Q. To someone like me to who that statement was 7 pretty much Greek, what -- what implications or 8 importance does that have to you as an engineer?</p> <p>9 A. There is a possibility that there will be a 10 part that does not meet that specification.</p> <p>11 Q. Okay. And in fact that --</p> <p>12 And what the following sentence says, "This 13 suggests at some point, we may have one of your 14 filters fall below the specification." When 15 "specification" is being used there, is that talk 16 about the 75 percent efficiency at .3 to one micron?</p> <p>17 A. Correct.</p> <p>18 Q. Okay. So what this sentence is saying is 19 that there is a chance that there are filters that 20 would allow even more than 25 percent of particles at 21 .3 to one micron to pass through the filter at the 22 flow rates tested.</p> <p>23 MR. GOSS: Object to form.</p> <p>24 A. There is a possibility.</p> <p>25 Q. Okay. The next statement says, "What would</p>

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<p>1 be the expectation from 3M if this were to happen?" 2 What kind of expectations are you 3 contemplating here? 4 A. The question relates to lot testing before 5 shipment, so I was trying to understand what the 6 expectations were from 3M if, down the road, one of 7 our samples pulled for testing fell below the 75 8 percent removal at that range. 9 Q. Okay. And what kind of steps could be taken 10 in that situation that you were contemplating at that 11 point? 12 A. There are a number of different steps that 13 could be taken. I was trying to understand what 3M's 14 expectation was. 15 Q. Okay. In the following sentence it states 16 that "...the initial filtration efficiency according 17 to 52.2-2012 will likely be the lowest efficiency for 18 a filter." What does that number refer to? 19 A. The 52.2 is an ASHRAE standard for measuring 20 particle efficiency for a filter, and it can either be 21 done as an initial test or a full test with particle 22 loading. 23 Q. Okay. And what's the difference between 24 those two? 25 A. In the case of the full test, the filter is</p>	<p>1 you're reading on these filters, are -- I mean -- 2 excuse me. 3 From what you're reading of this testing, 4 are there simply different filters that were tested in 5 this test? 6 A. My understanding is those were different 7 filters tested in this test. 8 Q. Okay. And the numbers that we see in the 9 chart, is it your understanding that those are 10 filtration-efficiency percentages? 11 A. Yes. 12 Q. Okay. So I want to look -- 13 For instance, in the -- in the first lot 14 that we see, in looking at the .3 to one-micron range 15 size, we have the filter performing a few percentage 16 points above 80 percent; correct? 17 A. They appear to range between 83 and 84, yes. 18 Q. Okay. And then in the bottom lot we see 19 some numbers that are approaching 76, and that was 20 what was being referenced in the prior paragraph to 21 this; correct? 22 A. Correct. 23 Q. Okay. And then I notice, for instance in 24 that lot there, the final lot, that at the one- to 25 three-micron size, that you were having numbers</p>

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<p>1 sizes; correct?</p> <p>2 MR. GOSS: Object to form.</p> <p>3 A. I would understand that numbers in the 90s 4 mean that something less than 100 percent is blocked.</p> <p>5 Q. Okay. All right. So after these charts 6 there's the discussion to be made -- you -- you offer 7 some discussion about some possibilities, and I want 8 to talk about each of those, and the first is that -- 9 to dispose of an entire lot of 1800 filters. Is this 10 because of that Cpk figure we talked about?</p> <p>11 A. This is discussion around lot testing and 12 the potential that one of the samples pulled for lot 13 testing were to not meet their MERV 14 requirement.</p> <p>14 Q. Okay. So the idea being that if there was a 15 lot pulled and it didn't meet the 75 percent at .3 to 16 one micron, one possibility would be to simply dispose 17 of the entire lot.</p> <p>18 A. Correct.</p> <p>19 Q. Okay. The second possibility is that those 20 filters could be provided to Porous Media, who could 21 then test them and attempt to determine why they are 22 not performing at that level; correct?</p> <p>23 A. That was one of the options I discussed with 24 Dr. Tan.</p> <p>25 Q. Okay. And then the third option you</p>	<p>Page 82</p> <p>1 Q. Okay. And here there was some discussion 2 about whether there is an upper limit or not for MERV 3 14 in that category; correct?</p> <p>4 A. Correct.</p> <p>5 Q. You've come to understand since that there 6 isn't an upper limit; is that correct?</p> <p>7 A. Dr. Tan pointed out to me that there was a 8 later addendum or modification of that standard in 9 2015, I believe, that removes that upper limit.</p> <p>10 Q. Okay. All right. I want to talk about Dr. 11 Tan's next e-mail, and some of that is discussed 12 there, but what I really want to draw your attention 13 to is point two, and let's read that together there 14 where Dr. Tan states, "The reason for the Lot# being 15 on the low end of MERV 14 is because of non-uniformity 16 of hot melt adhesive - 'a special cause here.'"</p> <p>17 What does he mean by "the non-uniformity of 18 hot melt adhesive?"</p> <p>19 A. I don't know.</p> <p>20 Q. Okay. Do you know, while we're talking 21 about the subject of MERV, what -- what does --</p> <p>22 What does MERV mean as a standard? Do you 23 know what that means?</p> <p>24 A. What does it stand for?</p> <p>25 Q. Let's start with there, yeah. Do you know</p>
<p>1 discussed with Dr. Tan is the possibility of a third 2 party testing the filters; correct?</p> <p>3 A. That is something I suggested as a third 4 option, not understanding the full MERV test at the 5 time.</p> <p>6 Q. Okay. When you say "not understanding the 7 full MERV test," what do you mean by that?</p> <p>8 A. Dr. Tan explained to me that they take the 9 lowest value at any point in the product life as the 10 MERV value.</p> <p>11 Q. Okay. The next statement I'm going to need 12 a little bit of help with, and it -- here we have 13 "Finally, according to 5 -- 52.2-2012..."</p> <p>14 So the first part of that, that's the ASHRAE 15 standard we talked about earlier; right?</p> <p>16 A. Correct.</p> <p>17 Q. Okay. So I'm just going to kind of 18 substitute that in the language so we can read this a 19 little bit easier. "Finally, according to the 20 standard, MERV 14 has an upper limit for E1 of 85 21 percent."</p> <p>22 E1, is that the particle-range size?</p> <p>23 A. Correct.</p> <p>24 Q. That's .3 to one micron?</p> <p>25 A. Yes.</p>	<p>Page 83</p> <p>1 what "MERV" stands for?</p> <p>2 A. It's --</p> <p>3 I believe it stands for Minimum Efficiency 4 Reporting Value.</p> <p>5 Q. Okay. Does -- does --</p> <p>6 When we use terms like "HEPA," does -- is 7 HEPA a -- a term within the MERV system, or does it 8 have an equivalent MERV rating, or how does that -- 9 how do they relate to each other?</p> <p>10 A. HEPA goes back to like the 1950s, I believe, 11 and is a separate standard from this ASHRAE standard.</p> <p>12 Q. Okay. In other words, is -- is a --</p> <p>13 A MERV 14 filter, can that be a HEPA filter?</p> <p>14 A. A filter might be able to meet both HEPA and 15 at least MERV 14.</p> <p>16 Q. In fact, a HEPA filter might be higher on 17 the MERV scale.</p> <p>18 A. It may be.</p> <p>19 Q. Okay. Have you --</p> <p>20 Do you know if Porous Media has ever talked 21 with 3M about improving the filter, not from the 22 current filter to a HEPA media, but from a MERV 14 to 23 a MERV 15 filter?</p> <p>24 A. I'm not aware of discussions around MERV 15.</p> <p>25 Q. Okay. All right. So let's move on to your</p>

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<p>1 next e-mail, which will be on the first page of this 2 document, and there are five points in your e-mail 3 that I want -- we'll talk about some of those, and the 4 first one is point number two that I want to talk to 5 you about, and it discusses how it appears that a lot 6 that was tested "...demonstrated consistently lower 7 test values than the other two lots, with every single 8 element showing lower efficiency than every single 9 element of the other two lots at E1."</p> <p>10 Can you tell me, as from an engineering 11 standpoint, is that finding significant to you, and 12 why?</p> <p>13 A. I found it notable enough to bring up with 14 Dr. Tan.</p> <p>15 Q. Okay. And what importance does -- does that 16 have to you?</p> <p>17 In fact, let me withdraw that question 18 because I think what I need to be asking you is about 19 something you said in that point. And do you see how 20 on the following line after that statement you state, 21 "Can you return those elements to us for 22 investigation?" What is it that you were hoping to 23 investigate there?</p> <p>24 A. There seemed to be a lower efficiency on 25 that production lot than the others, and Winston</p>	<p>1 A. Exactly. 2 Q. Okay. All right. Do you know if those 3 filters from that lot testing that were non- 4 conforming, do you know or -- I'm not -- how -- how is 5 the best way -- 6 In other words, there was a -- there was a 7 lot involved in the testing that you wanted to 8 investigate; correct?</p> <p>9 A. There were some parts that they tested from 10 one production lot that I asked for them to return to 11 our quality department for investigation.</p> <p>12 Q. Okay. Did that happen?</p> <p>13 A. I don't know.</p> <p>14 Q. Okay. So sitting here today, you don't know 15 if -- if -- if any reason or -- or explanation was 16 ever discovered for what we see in this testing.</p> <p>17 A. Correct.</p> <p>18 MR. BANKSTON: Okay. All right. Just a 19 little housekeeping I think. Let's see.</p> <p>20 (Exhibit 381 was marked for 21 identification.)</p> <p>22 BY MR. BANKSTON:</p> <p>23 Q. And I've handed you Exhibit 381. You 24 recognize this document?</p> <p>25 A. Yes.</p>

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<p style="text-align: right;">Page 90</p> <p>1 Q. Okay. Do you know if it is for a Bair 2 Hugger patient warming device? 3 A. I don't know. 4 Q. Okay. During the discussions about this 5 newer filter, let's -- 6 Hold on. Let me back up. 7 When it comes to working with 3M to develop 8 a new kind of filter for their devices, when did that 9 project first begin? 10 A. It seemed to come out of those discussions 11 in 2015. 12 Q. Okay. During those discussions to the 13 present, when talking about this new type of filter 14 unit, has there been any discussion of bacterial 15 contamination or airborne contamination? 16 A. No. 17 MR. BANKSTON: Okay. All right. I think 18 that's all I'm going to have for you today, Dr. 19 Crowder. 20 THE WITNESS: Okay. 21 MR. BANKSTON: I appreciate your time coming 22 down here and talking to us. Appreciate you teaching 23 us a few things, too, during the process. So again, 24 thank you for coming today. 25 THE WITNESS: Sure.</p>	<p style="text-align: right;">Page 92</p> <p>1 Q. And what MERV rating is that? 2 A. Fourteen. 3 Q. Would it be fair to say that a MERV 14 4 filter is highly efficient at filtering small 5 particles? 6 A. Yes. 7 Q. Does Porous/Pentair have an understanding as 8 to whether MERV 14 filters are commonly used to 9 control airborne bacteria? 10 A. No. 11 Q. So you do not have an understanding of the 12 use of MERV 14 to control airborne bacteria; is that 13 right? 14 A. Correct. 15 Q. Okay. Am I right that Porous has never told 16 3M that it should use a higher-efficiency media in its 17 Bair Hugger filters? 18 A. Not that I know of. 19 Q. You testified about, with respect to the 20 Exhibit 380, some of the testing that -- that -- of 21 the lot testing that Porous now does for 3M with 22 respect to the Bair Hugger filters. You recall that 23 testimony? 24 A. Yes. 25 Q. Does the addition of that testing</p>
<p style="text-align: right;">Page 91</p> <p>1 MR. BANKSTON: And I believe Mr. Goss may 2 have some questions for you. 3 THE REPORTER: Let's go off the record, 4 please. 5 (Recess taken.) 6 BY MR. GOSS: 7 Q. Dr. Crowder, my name is Peter Goss. I'm a 8 lawyer for 3M and I just a couple of questions for 9 you. 10 Am I right that all filters that Porous/ 11 Pentair makes for 3M today use the M20 filter media? 12 A. All filters that I understand for the 13 patient warming application. 14 Q. Thank you for that clarification. 15 So all Bair Hugger filters, as we refer to 16 them, use the M20 media? 17 A. Correct. 18 Q. Okay. And that's -- that's been true at 19 least since 2009 to your knowledge? 20 A. Correct. 21 Q. Okay. And have you seen test data 22 establishing a particular MERV rating for that M20 23 media in the specific filters that Porous/Pentair 24 makes for 3M? 25 A. Yes.</p>	<p style="text-align: right;">Page 93</p> <p>1 requirement, does that increase the cost to 3M of the 2 filters that Porous provides? 3 A. Yes. 4 Q. Okay. Do you know how much it increases the 5 cost? 6 A. I don't remember exactly. 7 MR. GOSS: That's all the questions I have 8 for you, sir. Thank you. 9 THE WITNESS: You're welcome. 10 MR. BANKSTON: All done. 11 THE REPORTER: Off the record, please. 12 (Deposition concluded.) 13 14 15 16 17 18 19 20 21 22 23 24 25</p>

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1 C E R T I F I C A T E

2 I, Richard G. Stirewalt, hereby certify that
3 I am qualified as a verbatim shorthand reporter, that
4 I took in stenographic shorthand the deposition of
5 ROBERT O. CROWDER at the time and place aforesaid, and
6 that the foregoing transcript is a true and correct,
7 full and complete transcription of said shorthand
8 notes, to the best of my ability.

9 Dated at Deerwood, Minnesota, this 22nd day
10 of March, 2017.

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17 RICHARD G. STIREWALT
18 Registered Professional Reporter
19 Notary Public
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1 C E R T I F I C A T E

2 I, ROBERT O. CROWDER, hereby certify that I
3 have carefully read the foregoing transcript, and that
4 the same is a true and complete, full and correct
5 transcription of my deposition, except:

6 PAGE/LINE CHANGE REASON

7
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16
17 ROBERT O. CROWDER
18 Deponent
19

20 Signed and sworn to before me this ____ day of
21 April, 2017.

22
23
24 Notary Public
25

25 (Pages 94 to 95)